

Amendments to the Drawings

The attached sheets of drawings include changes to Figures 6 and 9. These sheets, which include Figures 6 and 9, replace the original sheets including Figures 6 and 9. In both figures, previously mis-labeled term " $F + D$ " has been replaced by " $F_{dis} + D$ ".

Attachments:

Replacement sheets for sheets 6 and 9.

Annotated Sheets Showing Changes.

REMARKS

Drawing Corrections

In both Figures 6 and 9, previously mis-labeled term " $F + D$ " has been replaced by " $F_{dis} + D$ ". Please note that various values of F_{dis} , D , M , and M_n , are known as indicated in paragraph 0113 of the present application as published. Approval of the corrected drawings and replacement sheets submitted herewith is respectfully requested.

Response to Claim Objections and Rejections - 35 USC § 112

The examiner objected to claims 1-3 and also rejected claims 1-3 under 35 USC § 112. Claims 1-3 have now all been amended for clarity, antecedent basis and to otherwise comport with the requirements of 35 USC § 112 as detailed in the amended claims section above. Applicant submits that the claims are now in compliance with 35 USC § 112 and are in condition for allowance based on the amendments and arguments herein.

Traversal of Claim Rejections - 35 USC § 103

The Examiner has rejected claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nowlin et al. U.S. Patent No. 6,879,880 (hereinafter Nowlin) in view of Takeishi et al. U.S. Patent No. 6,516,991 (hereinafter Takeishi). In view of the arguments and amendments herein, applicants respectfully traverse the rejection and submit that claims 1-3 are allowable over the references, whether taken singly or in any combination.

Under 35 U.S.C. 103(a) the following tenets apply:

- (1) the claimed invention must be considered as a whole;
- (2) the references must be considered as a whole;
- (3) there must be some reason articulated why one of ordinary skill in the art would combine the references to make the claimed combination;

(4) the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and

(5) reasonable expectation of success is the standard by which obviousness is determined. For example, it is improper to combine references where one reference teaches away from the combination. References that teach away from the claimed invention negate any alleged reason to combine, as one of ordinary skill in the art would neither make the combination nor expect success.

In this case, as was argued in the last response and not refuted, Nowlin et al. teaches a master/slave system for a surgical robot that incorporates a biasing system like a spring sensor for directly sensing force applied to a set of grip members. Nowlin et al. teaches away from the present invention in that Nowlin et al. uses a direct force sensor, namely, a spring sensor specifically to provide tactile feedback for a grip.

See, for example, Nowlin et al. claim 7:

"The robotic system of claim 1 wherein the biasing system comprises a variable rate spring that provides altered tactile feedback at the predetermined grip separation." (Claim 7, emphasis added).

See also, for example, FIGS. 11Di and 11Dii illustrating the biasing system of Nowlin et al. having a variable rate spring for providing tactile feedback of an enhanced grip actuation force. A spring sensor is the type of direct force sensing element that the present invention seeks to eliminate and replace with an indirect force sensing estimator.

The Examiner now states that Nowlin reference also provides other embodiments that do not utilize a biasing system (see Figures 9A and 9B and C9 L40-67, C10 and C11). A fair reading of Nowlin would suggest that the biasing system is not intended to be left out of these other embodiments. However, even if intended, in fashioning a combination with Takeishi the references have not been considered as whole in alleging that one skilled in the art would incorporate Takeishi's reaction force detection means into Nowlin's system. This is not a case where a simple substitution of

one known element would result in predictable results. Nowlin's grip is hand held and Takeishi is used in an automated wire bonding machine. The Examiner has provided no rationale showing how one skilled in the art would make the substitution of Takeishi's automated device into Nowlin's hand-held device to arrive at the present invention with predictable results. It is only by impermissibly using applicant's disclosure as a roadmap that one would be lead to the present invention. Therefore one skilled in the art would not logically be lead to the combination. Thus, the combination of these references is impermissible under § 103 and claims 1-3 are patentable over the references whether taken singly or in any combination.

Even if, hypothetically, the references were combined, Takeishi does not supply the claimed elements lacking in Nowlin. Specifically with respect to both claims 1 and 2, amendment to element (iii) "reaction force detection means" makes it clear that reaction force itself excluding "frictional force and inertia variation" is purely detected. U.S. Patent Publication of the present Application clarifies at paragraph [0112] and in Figs. 6 and 9 that the reaction observers 2, 4 estimate reaction force itself when the frictional force and the inertia variation are removed. More specifically, F_{init} is subtracted in equation (1) that estimates the estimated reaction force. The term $F_{dis} + D$ in the F_{init} equation indicates frictional force (the whole of dynamical friction and static friction), and the second term $(M - M_0)X'$ indicates the force of the inertia variation.

In contrast to the present invention, the "turbulence observer" shown in Takeishi's Fig. 9 is not such a reaction detection means as in the present application but it estimates overall turbulence including friction to an object or the like. This is different in technical features from the present application where *only* reaction is purely estimated by avoiding the influences of the foregoing frictional force and inertia variation. Thus claims 1 and 2 as amended are allowable over the references.

Therefore, in view of the arguments and amendments herein, applicants respectfully traverse the rejection and submit that claims 1-3 are allowable over the references, whether taken singly or in any combination. Claims 4 – 7 are likewise patentable as being dependent on allowable independent claims.

Japanese Publication JP2004-49523

Please note that reaction estimation means for estimating reaction force when inertia force is subtracted has been disclosed in JP 2004-49523. But in the reaction estimation means, frictional force is not subtracted (Please see English Abstract of the JP Patent Pub (JP2004-49523) and English partial translation of relevant portions in the JP Patent Publication attached to the Supplemental Information Disclosure submitted herewith). Note that Kouhei Ohnishi the inventor of the present application is also the inventor of the JP Patent Pub. JP Patent Pub (JP2004-49523). Applicants submit that all claims pending in the present application are patentable over JP Patent Pub (JP2004-49523) and all of the references whether taken singly or in any combination.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Applicants' Attorney so that such issues may be resolved as expeditiously as possible. The government fee associated with the filing of this Information Disclosure Statement is being paid concurrently.

Conclusion

Should any additional fees or extensions of time be necessary in order to maintain this Application in pending condition, appropriate requests are hereby made and authorization is given to debit Account #02-2275.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

CERTIFICATE

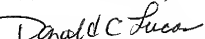
I hereby certify that this correspondence is being EFS-Web or facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 4, 2008.

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